REMARKS

These remarks are in response to the Office Action mailed October 24, 2001. The Office Action rejected pending claims 4-9, 11, 17-21, 23-27, and 29-36 and objected to claims 12, 22, and 28, indicating that they would be allowable if rewritten in independent form. (Claims 1-3, 10, and 13-16 have been formerly withdrawn.) Claims 12, 22, and 28 have been amended to conform to the comments of the Office Action and are now believed allowable. Although all of the rejected claims are believed allowable in their previous form, claims 4, 8, 11, 20, and 34 have been amended as described below.

Claims 4-9, 11, 17-21, 23-27, and 29-36 were rejected under 35 U.S.C. 103(a) over Monti, U.S. 5,557,236 and one or more secondary references. As noted in the Office Action, the Monti '236 patent does present a bi-directional pin, as shown there in Figure 2 (that is also the cover figure). As is notated on the figure, this pin is for supplying a digital output and digital input, as is further described in the specification (column 2, lines 47-48): "The voltage level on pin 2 defines the logical state of the digital output." As the rest of the specification makes clear, by digital, the patent means binary; that is, the pin is capability of distinguishing only two distinct input and output levels, a high logic level and a low logic level. This is described in detail beginning at column 3, line 56. For example, a specific formula for the high logic level is given at column 4 , line 18, and again at lines 29-30. Thus, although the Office Action is correct in that the pin can serve both an input and an output function, is only usable for a (binary) digital that is only suitable for a control signal, not for an audio signal to drive a speaker. In the present invention as embodied in the pending claims, it is the use of the pin in providing a signal suitable for an audio signal to drive a speaker that is of interest.

Although the Monti patent talks of an audio device, in particular something known as a TDA 7337, and shows something called an AMS (Automatic Music Sensor) 3 in Figure 2, is clear from rest of patent that the pin 2 is for use in transferring a control signal, not any type audio output, due to its binary---and not analog---nature. Whatever the purpose and function of a TDA 7337, if it is supplying some sort of audio output it will be through an additional pin that is not shown rather than through pin 2.

The Office Action rejected claims 4-9, 11, 17-21, 23-27, and 29-36 under 35 U.S.C. 103(a) over Monti and one or more secondary references. As described in the preceding discussion, due to the nature of the output of the single input/output pin of Monti, is not believed obvious to combine the teachings of Monti with a speaker as the resultant output

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of the signal would not be usable. Consequently, it is therefore believed that the rejections of the Office Action are not well founded. However, to make the distinctions over the prior art more explicit, independent claims 4, 8, 11, 20, and 34 have been amended and now all contain language such as that found in claim 4:

> an output circuit coupled to the first terminal, wherein the output circuit applies to the first terminal an analog output signal to drive the speaker;

or similar language. Thus, it is believed that claims 4, 8, 11, 20, and 34 and their dependent claims, claims 5-7, 9, 21, 23-26, and 35-36, are allowable over the prior art and that a rejection under 35 U.S.C. 103(a) is not well founded.

The other independent claims, 17 and 29, have not been amended to include that the output signal is analog, but respectively contain the language "an output signal representing a sound" and "supplying to the input/output pin a series of values representing said audio signal". As the described output on the pin of Monte does not meet these descriptions, it is believed that the distinction in these claims is clear without further amendment and that claims 17 and 29, along with their dependent claims 18-19, 27, and 30-33, are allowable over the prior art and that a rejection under 35 U.S.C. 103(a) is not well founded.

Thus, it is respectfully submitted that on this basis alone all of the rejected claims are allowable. Some of the claims are further believed allowable for additional reasons.

Claims 11 and 19 both include the limitation that the circuit is contained in a three pin package. As described above, the single input/output pin of the Monti patent is suitable for a control signal, but not for the analog representation of a sound. Consequently, a circuit based on Monti would require a second pin for this output, which when combined with a ground and power supply connection results in a minimum of four pins.

Claim 6 introduces an amplifier coupled to the first terminal. As in Monti this pin is only to supply a logical level and not to provide a signal suitable for driving a speaker, the introduction of an amplifier in this way would make no sense with the binary operation of Monti. Claim 17 introduces a sound processing circuit that would similarly make no sense coupled to the binary operation of the pin of Monti.

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For any of these reasons, reconsideration of the Office Action's rejection of claims 4-9, 11, 17-21, 23-27, and 29-36, and objection to claims 12, 22, and 28, is therefore respectfully requested, and an early indication of their allowability is earnestly solicited.

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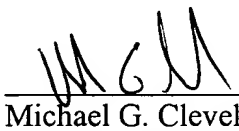
Respectfully submitted,



Michael G. Cleveland
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1-24-02
Date

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Appendix

Marked-Up Versions of Amended Claims

4.(Twice Amended) A sound processing system comprising:

a speaker;

an integrated circuit having a first terminal coupled to the speaker, the integrated circuit further comprising:

an output circuit coupled to the first terminal, wherein the output circuit applies to the first terminal an analog output signal to drive the speaker;

an input circuit coupled to the first terminal, wherein the input circuit processes an input signal from the speaker via the first terminal

a functional unit; and

an activation circuit that activates the functional unit in response to the input signal from the speaker exceeding a threshold level, wherein the functional unit is coupled to the output circuit and begins an output operation to drive the speaker in response to being activated by the activation circuit.

8.(Twice Amended) A sound processing system comprising:

a speaker;

an integrated circuit having a first terminal coupled to the speaker, the integrated circuit further comprising:

an output circuit coupled to the first terminal, wherein the output circuit applies to the first terminal an analog output signal to drive the speaker;

an input circuit coupled to the first terminal, wherein the input circuit processes an input signal from the speaker via the first terminal;

a memory array; and

access circuitry capable of reading values from the memory array, wherein:

the output circuit comprises a converter coupled to the access circuitry, wherein the converter converts a series of values read by the access circuitry into an analog signal that determines the output signal.

11.(Twice Amended) A sound processing system comprising:

a speaker;

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an integrated circuit having a first terminal coupled to the speaker, the integrated circuit further comprising:

an output circuit coupled to the first terminal, wherein the output circuit applies to the first terminal an analog output signal to drive the speaker; and

an input circuit coupled to the first terminal, wherein the input circuit processes an input signal from the speaker via the first terminal,

wherein the integrated circuit is in a three pin package including a first pin connected to the speaker and the first terminal of the integrated circuit, a second pin for connection to a power supply, and a third pin for connection to ground.

12.(Amended) A [The] sound processing system [of claim 11] comprising:

a speaker;

an integrated circuit having a first terminal coupled to the speaker, the integrated circuit further comprising:

an output circuit coupled to the first terminal, wherein the output circuit applies to the first terminal an output signal to drive the speaker; and

an input circuit coupled to the first terminal, wherein the input circuit processes an input signal from the speaker via the first terminal,

wherein the integrated circuit is in a three pin package including a first pin connected to the speaker and the first terminal of the integrated circuit, a second pin for connection to a power supply, and a third pin for connection to ground, and wherein the three pin package is a T092 package.

20.(Amended) A method for operating a sound processing system, comprising:

connecting a terminal of a sound processing circuit to a speaker;

creating a vibration in the speaker that causes the speaker to generate an input signal to the terminal of the sound processing circuit;

activating a functional unit in the sound processing circuit in response to the input signal; and

in response to activating the functional unit, generating an analog output signal from the functional unit through the terminal to the speaker, wherein the output signal drives the speaker to produce a sound.

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22.(Amended) A [The] method [of claim 20] for operating a sound processing system, comprising:

connecting a terminal of a sound processing circuit to a speaker;

creating a vibration in the speaker that causes the speaker to generate an input signal to the terminal of the sound processing circuit, wherein creating the vibration comprises touching in the speaker;

activating a functional unit in the sound processing circuit in response to the input signal; and

in response to activating the functional unit, generating an output signal from the functional unit through the terminal to the speaker, wherein the output signal drives the speaker to produce a sound.

28.(Amended) A [The] method [of claim 20] for operating a sound processing system, [further] comprising:

connecting a terminal of a sound processing circuit to a speaker;

creating a vibration in the speaker that causes the speaker to generate an input signal to the terminal of the sound processing circuit;

activating a functional unit in the sound processing circuit in response to the input signal; and

in response to activating the functional unit, generating an output signal from the functional unit through the terminal to the speaker, wherein the output signal drives the speaker to produce a sound; and

recording an audio input by said functional unit through the speaker prior to creating the vibration, wherein the output signal is derived from the audio input.

34.(Amended) A method for operating a sound processing unit, comprising:

connecting a terminal of a sound processing circuit to a speaker;

recording by the sound processing circuit an audio input received through the speaker;

generating an input signal to the terminal of the sound processing circuit; and

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in response to the input signal, supplying from the sound processing circuit through the terminal to the speaker an analog output signal derived from the audio input, wherein the output signal drives the speaker to produce a sound.

Pending Claims

(Claims 1-3 have been cancelled.)

4.(Twice Amended) A sound processing system comprising:

a speaker;

an integrated circuit having a first terminal coupled to the speaker, the integrated circuit further comprising:

an output circuit coupled to the first terminal, wherein the output circuit applies to the first terminal an analog output signal to drive the speaker;

an input circuit coupled to the first terminal, wherein the input circuit processes an input signal from the speaker via the first terminal

a functional unit; and

an activation circuit that activates the functional unit in response to the input signal from the speaker exceeding a threshold level, wherein the functional unit is coupled to the output circuit and begins an output operation to drive the speaker in response to being activated by the activation circuit.

5. The system of claim 4, wherein:

the functional unit comprises a memory array and access circuitry capable of reading values from the memory array; and

the output circuit comprises a converter coupled to the access circuitry, wherein the converter converts a series of values read by the access circuitry into an analog signal that determines the output signal.

6.(Amended) The system of claim 5, wherein the input circuit comprises:

an amplifier coupled to the first terminal;

a second converter coupled to the amplifier and the access circuitry, wherein the second converter converts the input signal from the speaker into a series of values read that the access circuitry writes to the memory array.

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7.(Amended) The system of claim 4, wherein the activation circuit includes a delay element coupled to prevent activation of the functional unit during a period following completion of an operation of the functional unit.

8.(Twice Amended) A sound processing system comprising:

a speaker;

an integrated circuit having a first terminal coupled to the speaker, the integrated circuit further comprising:

an output circuit coupled to the first terminal, wherein the output circuit applies to the first terminal an analog output signal to drive the speaker;

an input circuit coupled to the first terminal, wherein the input circuit processes an input signal from the speaker via the first terminal;

a memory array; and

access circuitry capable of reading values from the memory array, wherein:

the output circuit comprises a converter coupled to the access circuitry, wherein the converter converts a series of values read by the access circuitry into an analog signal that determines the output signal.

9.(Amended) The system of claim 8, wherein the input circuit comprises:

an amplifier coupled to the first terminal;

a second converter coupled to the amplifier and the access circuitry, wherein the second converter converts the input signal from the speaker into a series of values read that the access circuitry writes to the memory array.

(Claim 10 has been cancelled.)

11.(Twice Amended) A sound processing system comprising:

a speaker;

an integrated circuit having a first terminal coupled to the speaker, the integrated circuit further comprising:

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an output circuit coupled to the first terminal, wherein the output circuit applies to the first terminal an analog output signal to drive the speaker; and

an input circuit coupled to the first terminal, wherein the input circuit processes an input signal from the speaker via the first terminal,

wherein the integrated circuit is in a three pin package including a first pin connected to the speaker and the first terminal of the integrated circuit, a second pin for connection to a power supply, and a third pin for connection to ground.

12.(Amended) A sound processing system comprising:

a speaker;

an integrated circuit having a first terminal coupled to the speaker, the integrated circuit further comprising:

an output circuit coupled to the first terminal, wherein the output circuit applies to the first terminal an output signal to drive the speaker; and

an input circuit coupled to the first terminal, wherein the input circuit processes an input signal from the speaker via the first terminal,

wherein the integrated circuit is in a three pin package including a first pin connected to the speaker and the first terminal of the integrated circuit, a second pin for connection to a power supply, and a third pin for connection to ground, and wherein the three pin package is a T092 package.

(Claims 13-16 have been cancelled.)

17.(Twice Amended) An integrated circuit comprising:

an input/output pin;

a sound processing circuit;

an output circuit coupled to the input/output pin, wherein the output circuit applies to the input/output pin an output signal representing a sound;

an activation circuit coupled to the input/output pin and the functional unit, wherein in response to an input signal from the input/output pin, the activation circuit activates the sound processing circuit;

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an input circuit coupled to the input/output pin, wherein the input circuit, when active, transfers the input signal received from the input/output pin to the sound processing circuit; and

a control circuit coupled to the sound processing circuit, wherein the control circuit selects an operation performed by the processing circuit when the activation circuit activates the sound processing circuit, and

wherein the sound processing circuit comprises:

a first functional unit that performs an output operation to generate a signal to the output circuit and a second functional unit that performs an input operation to processes the input signal from the input circuit;

a memory array;

a read circuit coupled to the memory array, wherein the read circuit is part of the first functional unit and the output operation includes reading from the memory array a series of values representing a sound; and

a write circuit coupled to the memory array, wherein the write circuit is part of the second functional unit and the input operation includes writing to the memory array a series of values representing the input signal.

18.(Twice Amended) The integrated circuit of claim 17, wherein the activation circuit comprises a delay element coupled to prevent the activation circuit from activating the sound processing circuit during a delay period following completion of an operation by the sound processing circuit.

19.(Amended) The integrated circuit of claim 17, further comprising a die and a three-pin package in which the die is mounted, the three-pin package having exactly three pins including the input/output, a pin for connection to a power supply, and a pin for connection to ground.

20.(Amended) A method for operating a sound processing system, comprising:

connecting a terminal of a sound processing circuit to a speaker;

creating a vibration in the speaker that causes the speaker to generate an input signal to the terminal of the sound processing circuit;

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activating a functional unit in the sound processing circuit in response to the input signal; and

in response to activating the functional unit, generating an analog output signal from the functional unit through the terminal to the speaker, wherein the output signal drives the speaker to produce a sound.

21. The method of claim 20, wherein creating the vibration comprises making a noise that causes a vibration in the speaker.

22.(Amended) A method for operating a sound processing system, comprising:

connecting a terminal of a sound processing circuit to a speaker;

creating a vibration in the speaker that causes the speaker to generate an input signal to the terminal of the sound processing circuit, wherein creating the vibration comprises touching in the speaker;

activating a functional unit in the sound processing circuit in response to the input signal; and

in response to activating the functional unit, generating an output signal from the functional unit through the terminal to the speaker, wherein the output signal drives the speaker to produce a sound.

23. The method of claim 20, wherein the sound processing circuit is an integrated circuit and the terminal is a bi-direction input/output pin of the integrated circuit.

24. The method of claim 20, wherein generating the output signal comprises performing an output operation, and the method further comprising disabling activation of the functional unit during a delay time following the completion of the output operation.

25. The system of claim 6, wherein the output signal is derived from said series of values.

26. The system of claim 9, wherein the output signal is derived from said series of values.

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27. The integrated circuit of claim 17, wherein the output signal is derived from said series of values.

28.(Amended) A method for operating a sound processing system, comprising:

connecting a terminal of a sound processing circuit to a speaker;

creating a vibration in the speaker that causes the speaker to generate an input signal to the terminal of the sound processing circuit;

activating a functional unit in the sound processing circuit in response to the input signal; and

in response to activating the functional unit, generating an output signal from the functional unit through the terminal to the speaker, wherein the output signal drives the speaker to produce a sound; and

recording an audio input by said functional unit through the speaker prior to creating the vibration, wherein the output signal is derived from the audio input.

29.(Amended) An integrated circuit comprising:

an input/output pin;

a memory array; and

a sound processing circuit including:

a write circuit coupled to the memory array and to the input/output pin, wherein the write circuit performs an input operation that includes writing to the memory array a series of values representing an audio signal received from the input/output pin; and

a read circuit coupled to the memory array and to the input/output pin, wherein the read circuit performs an output operation that includes reading from the memory array and supplying to the input/output pin a series of values representing said audio signal.

30. The integrated circuit of clam 29, wherein said memory array is comprised of non-volatile memory cells.

31. The integrated circuit of claim 29, wherein said series of values are analog values.

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32. The integrated circuit of claim 30, wherein said memory array comprises a FLASH EEPROM memory.

33. The integrated circuit of claim 29, further comprising:

an activation circuit coupled to the input/output pin and to the sound processing circuit, wherein the sound processing circuit is activated by the activation circuit to supply said audio signal to the input/output pin in response to an input signal received from the input/output pin.

34.(Amended) A method for operating a sound processing unit, comprising:

connecting a terminal of a sound processing circuit to a speaker;

recording by the sound processing circuit an audio input received through the speaker;

generating an input signal to the terminal of the sound processing circuit; and

in response to the input signal, supplying from the sound processing circuit through the terminal to the speaker an analog output signal derived from the audio input, wherein the output signal drives the speaker to produce a sound.

35. The method of claim 34, wherein said input signal is generated by creating a vibration in the speaker.

36. The method of claim 34, wherein the sound processing circuit is an integrated circuit and the terminal is a bi-directional input/output pin of the integrated circuit.

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